Relativistic scattering ....

If the relativistic effects are taken into account, the motion of an electron in a constant magnetic field $\underline{H}_0$, and high-frequency electric field $\underline{E}$ and magnetic field $\underline{H}$ is described by:

$$\frac{d}{dt}(m\dot{r}) = -e\left\{E_{\sim} + \frac{1}{c}[\dot{r}, H_0 + H_{\sim}]\right\}, \qquad (4)$$

where $m = m_0(1 - \underline{r}^2/c^2)^{-1/2}$, where m_0 is the rest mass and e is the absolute value of the electron charge. By considering this equation, it is shown that the scattering equations of the system in polar coordinates r, θ and z are in the form of:

$$r_n = \frac{e}{m} V_0 \frac{G_{rn}\Delta\omega_n - iG_{\omega n}\omega_H}{\Delta\omega_{n-1}\Delta\omega_n\Delta\omega_{n+1}};$$

$$r_0\theta_n = \frac{e}{m} V_0 \left\{\frac{iG_{rn}\omega_H + G_{\theta n}\Delta\omega_n}{\Delta\omega_{n-1}\Delta\omega_n\Delta\omega_{n+1}} - \frac{G_{zn}\beta_z\beta_z + G_{\omega n}\beta_\perp^2}{(\Delta\omega_n)^2}\right\}; \qquad (12)$$

$$z_n = \frac{e}{m} V_0 \frac{G_{zn}(1 - \beta^2) - G_{\omega n}\beta_z\beta_z}{(\Delta\omega_n)^2}.$$

Card 5/10

Relativistic scattering ....

where ω_H is the gyromagnetic frequency,

$\beta_{\parallel} = v_{\parallel}/c$ and $\beta_{\perp} = v_{\perp}/c$;

in the above, the longitudinal velocity $v_z = v_{\parallel}$ and the transverse velocity is $v_{\perp}$. These equations can be used for determining the scattering equation for a waveguide with a helical beam and it is shown that if the beam interacts with only one normal wave, the equation is:

$$k - k_0 = -\frac{e}{m}\frac{I_0}{v_1 N}\frac{\omega}{(\omega - kv_1 + p\omega_H)^2}\{|G_{zp}|^2(1-\beta_1^2) - \quad (15)$$

$$-|G_{\omega p}|^2\beta_1^2 - (G_{\omega p}G_{zp}^* + G_{\omega p}^* G_{zp})\beta_1\beta_{\perp} + O(\varepsilon, \delta)\},$$

where $O(\varepsilon, \delta)$ is the remainder term containing ε and δ with the degree higher than one. In the case of a weakly relativistic electron beam, Eq. (15) can be simplified and the following expression is obtained:

Card 6/10

Relativistic scattering ....

$$\delta(\delta-\varepsilon)^2=-\frac{I_0}{2U_0}\frac{k_*}{k_0^3N}\left\{|G_{rp}|^2-\beta_\perp^2|G_{\theta p}|^2+\right.$$

$$+(\delta-\varepsilon)\frac{k_0}{2k_H}\left[-4\,\mathrm{Im}(G_{rp}G^*_{\theta p})+|G_{r(p-1)}|^2+2\,\mathrm{Im}\,(G_{r(p-1)}G^*_{\theta(p-1)})+\right. \quad (16)$$

$$\left.\left.+|G_{\theta(p-1)}|^2-|G_{r(p+1)}|^2+2\,\mathrm{Im}\,(G_{r(p+1)}G^*_{\theta(p+1)})-|G_{\theta(p+1)}|^2+\bar{O}(\varepsilon,\delta)\right]\right\},$$

where U_0 is the longitudinal potential of the beam. In the special case, when a weakly relativistic helical beam interacts with a TE_{01}-wave in a rectangular waveguide, the scattering equation becomes:

$$\delta(\delta-\varepsilon)^2=\frac{I_0}{4U_0}\frac{4\pi}{c}(ak_{TE_{01}})^{-1}\left[\frac{1}{2}\pi^2\frac{\beta_\perp^2}{\beta_z}+\right.$$

$$\left.+(\delta-\varepsilon)\frac{\omega^2 a}{\omega_H c}ak_{TE_{01}}\right]\frac{a}{b}\cos^2\left(\frac{\pi}{a}x\right) \quad (17)$$

Card 7/10

Relativistic scattering ....

For the TEM-wave in a strip waveguide, the scattering equation is in the form:

$$\delta(\delta-\varepsilon)^2=-\frac{1}{8}\frac{\omega_p^2}{\omega^2}\frac{1}{\beta_1^2 n_z^4}\left[\beta_1^2(n_z^2-1)-(\delta-\varepsilon)\frac{\omega\beta_1 n_z}{\omega_H}\right], \qquad (17a)$$

Eqs. (15) or (16) determine the relationship between the propagation constants of the waves in a "cold" waveguide with the frequency ω. It is therefore possible to solve the problem of wave propagation in an infinite system. However, in the case of finite systems, it is necessary to investigate the stability of an autonomous system and the wave propagation at a given frequency in a stable system. In the case of a trochoidal electron beam controlled by crossed electric and magnetic fields, the equations for the coefficients r_n', Φ_n' and x_n' are in the form:

Card 8/10

Relativistic scattering ....

$$r_n' = \frac{e}{m'} V_0' \frac{G_{xn}' \Delta\omega_{n-1}' - G_{xn}' \omega_H'}{\Delta\omega_n' \Delta\omega_{n-1}'};$$

$$r_0' \theta_n' = \frac{e}{m'} V_0' \left\{ \frac{i G_{xn}' \omega_H' + G_{xn}' \Delta\omega_H' - \beta_z'^2 G_{xn}'}{\Delta\omega_{n-1}' \Delta\omega_n' \Delta\omega_{n+1}'} \right\}; \qquad (19)$$

$$x_n' = \frac{e}{m'} V_0' \frac{G_{xn}'}{(\Delta\omega_H')^2}; \qquad \Delta\omega_n' = \omega' + n\omega_H',$$

which are analogous to Eqs. (12). It is shown that in this case the scattering equation for a waveguide with this type of beam is in the form of

$$k - k_0 = -\frac{e}{m'} \frac{I_0}{v_1 N} \frac{\omega(1-\beta_z^2)^{3/2}}{[\omega - kv_1 + p\omega_H'(1-\beta_z^2)^{1/2}]^2} \times \qquad (27).$$

$$\times \{ |G_{xp}'|^2 - \beta_z'^2 |G_{zp}'|^2 + O_1(z, \delta) \}.$$

Card 9/10

Relativistic scattering ....

This is fully analogous to Eq. (15). The similarity of the scattering equations shows that the general characteristics of the systems with helical and trochoidal electron beams are identical.

There are 2 figures and 16 references: 12 Soviet-bloc and 4 non-Soviet-bloc. The 4 English-language references mentioned are: Ref. 4 - quoted in text; Ref. 11 - M. Muller, Proc. IRE, 42, 1651, 1954; Ref. 12 - R. Warnecke, Proc. IRE, 38, 486, 1950; Ref. 16 - D.A. Sturrock, Phys. Rev. 112, 1488, 1958.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute of Gor'kiy University)

SUBMITTED: December 29, 1960

Card 10/10

S/109/62/007/004/006/018
D230/D302

4.4230

AUTHORS: Gaponov, A.V., and Yulpatov, V.K.

TITLE: Interaction of closed electron beams with an electromagnetic field in hollow cavities

PERIODICAL: Radiotekhnika i elektronika, v. 7, no. 4, 1962, 631 - 643

TEXT: Expressions are obtained for the fields excited in a cavity by a thin closed electron beam and for the case of an arbitrarily-distributed electron stream in a cavity volume, the condition being that in an unexcited state all electrons move in closed trajectories. In deriving the equation for the frequencies of normal cavity oscillations with a closed electron beam, the examination is limited to the case when the unexcited electron ring is stationary and does not change with time; it is assumed that the current in the unexcited beam is constant. The system is in equilibrium when the field in the resonator is alternating and the current in the beam is constant. The investigation of the equilibrium of the system reduces to studying small electron oscillations close to the unexci-

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ted trajectories under the action of a matched alternating e.m. field. The resonator losses can be calculated from the characteristic equation. The possibility of self-excitation of the microwave oscillations in the cavity with a ring electron beam is examined; in this case the resonant interaction between the electron stream and the e.m. field in the cavity is studied when one of the natural beam frequencies is close to the partial frequency of the cavity. A third-order equation having complex roots is deduced showing that self-oscillation can take place in a microwave with an electron beam. Certain cases of interaction between the ring electron beam and the e.m. cavity fields are considered. In a quadripole electric cavity field with the beam lying in the plane z = 0 the requisite spatial grouping of the electrons is caused by the z-component of the field falling into the retarding field always in the same phase. When the ring electron beam is in a constant cavity field it is shown that self-excitation depends on a relativistic effect. All examples of self-excited oscillations are discussed in terms of the electron gyro-frequency. Self-excitation can also take place on harmonics of the gyro-magnetic frequency; for this purpose the corresponding spatial field harmonics in the region occupied by the beam

Interaction of closed electron beams ...

should be different from zero; generally, this is the case in any constant field. There are 5 figures and 20 references: 18 Soviet-bloc and 2 non-Soviet-bloc.

SUBMITTED: August 28, 1961

Card 3/3

ACCESSION NR: AP4042516 S/0109/64/009/007/1188/1197

AUTHOR: Belyantsev, A. M.; Gaponov, A. V.

TITLE: Waves with complex propagation constants in coupled transmission lines having no energy dissipation [Report at the All-Union Radio-Day Conference, Moscow, 1961]

SOURCE: Radiotekhnika i elektronika, v. 9, no. 7, 1964, 1188-1197

TOPIC TAGS: transmission line, coupled transmission lines, propagation constant, complex propagation constant

ABSTRACT: Using coupled transmission lines describable by telegraph or difference (in case of periodic structures) equations as a model, the conditions of existence and methods of setting up waves having complex propagation constants are investigated. This dispersion equation determining the propagation constants β_i is developed:

$$\beta_i^2 = \frac{1}{2}(A \mp \sqrt{D}).$$

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ACCESSION NR: AP4042516

Here: $A = \beta^2_{01} + \beta^2_{02} - 2\beta_{01}\beta_{02}bf$;

$$D = (\beta^2_{01} - \beta^2_{02})^2 - 4\beta_{01}\beta_{02}[b/(\beta^2_{01} + \beta^2_{02}) + \beta_{01}\beta_{02}(b^2 + f^2)];$$

$\beta_{0m} = (X_m B_m)^{1/2}$ are the partial propagation constants; f and b are the coupling factors. The case of a matched load connected to the line is considered. The effect of the dissipation of energy in the coupled lines on the imaginary part of the propagation constant is explored, as well as the waves in periodic structures. Supporting experiments with a set of coupled Π - and T-waveguides with gratings are briefly reported. "In conclusion, the authors wish to thank V. I. Kryukova who performed a considerable part of the measurement of dispersion characteristics of the coupled Π - and T-waveguides." Orig. art. has: 9 figures and 20 formulas.

ASSOCIATION: none

SUBMITTED: 28Apr64 ENCL: 00

SUB CODE: EC NO REF SOV: 008 OTHER: 000

Card 2/2

ACCESSION NR: AP4043670 S/0109/64/009/008/1368/1373

AUTHOR: Gaponov, A. V.; Petelin, M. I.

TITLE: High-frequency instability of a curvilinear beam of electrons moving in a periodic static field

SOURCE: Radiotekhnika i elektronika, v. 9, no. 8, 1964, 1368-1373

TOPIC TAGS: electron beam, curvilinear electron beam, electron beam formation, SHF tube

ABSTRACT: The interaction (in a linear approximation) between a strongly accelerated thin electron beam focused by an arbitrary periodic electrostatic field and electromagnetic waves, in a cylindrical waveguide of arbitrary cross-section, is considered. The electron current is assumed to be so small that the normal mode $\vec{E}^* \simeq V_0\vec{E}^0(x, y)e^{i(\omega t - hz)}$ is close to the normal "cold" waveguide mode $\vec{E}^* = \vec{E}^0(x, y)e^{i(\omega t - h_0 z)}$; $|h - h_0| \ll h_0$. The undisturbed motion of electrons in a static field is

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ACCESSION NR: AP4043670

represented by the superposition of a uniform longitudinal motion with a velocity v, a fast oscillating motion with a frequency $\Omega = 2\pi v/d$ (where d is the field period), and transverse drift oscillations due to the effective averaged field. It is proven that, with a resonance interaction between the electromagnetic wave and the electron beam, at combination harmonics of fast and drift oscillations, the h-f field increases along the waveguide. As the motion of strongly accelerated electrons in a periodic electrostatic field is similar to the motion of electrons in a slightly nonuniform h-f field, it is to be expected that the electron beam focused by an ω-frequency TW may prove unstable with respect to another wave whose frequency is a combination harmonic of ω and drift frequencies. Orig. art. has: 28 formulas.

ASSOCIATION: none

SUBMITTED: 18Mar63 ENCL: 00

SUB CODE: EC NO REF SOV: 006 OTHER: 003

Card 2/2

L 15710-65 EWT(l)/EEC-4/EEC(t)/EEC(b)-2/EWA(h) Peb ASD-3/ESD-3/RADC/APGC/SSD/ESD(t)/ESD(c)/AEDC(a)/BSD/SSD(b)/AFWL/ASD(a)-5/ASD(f)-2/ASD(p)-3/AFETR/RAEM(a)

ACCESSION NR: AP5000317 S/0056/64/047/005/1699/1710 B

AUTHOR: Belyantsev, A. M.; Gaponov, A. V.; Daume, E. Ya.; Freydman, G. I.

TITLE: Experimental investigation of propagation of finite amplitude electromagnetic waves in ferrite-filled waveguides 25

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 5, 1964, 1699-1710

TOPIC TAGS: waveguide, waveguide wave propagation, ferrite filled waveguide, electromagnetic shock wave

ABSTRACT: Propagation of shock waves in a coaxial ferrite-filled waveguide composed of two sections 90 and 80 cm long was investigated. A high-resistance voltage divider connected to the junction of the sections furnished the controlling voltage to a high-speed oscillograph. The passband of the system permitted measurements of wavefront durations of 1 nsec and more. The sections of the waveguide were contained in two solenoids with a longitudinal field component up to 300 oe. The azimuthal component was formed by current flowing

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L 15710-65
ACCESSION NR: AP5000317

in the inner conductor of the coaxial waveguide. Tubes of F-1000 ferrite (with a dielectric constant between 16 and 20) with inner and outer diameters of 8 and 16 mm enclosed the inner conductor. The formation and propagation of shock waves were investigated first with two patterns of permanent ferrite magnetization; longitudinal field only and a field having both longitudinal and azimuthal components. Then, the same investigation was carried out with nonmagnetized ferrite. Furthermore, the structure of shock wave fronts was studied under various conditions of ferrite magnetization. In the case of a longitudinal field, the shock waves were found to result from the evolution of simple waves. Thus, the input pulse would tend toward increasing the rise rate at its front, and flatten the trailing edge as it propagates within the waveguide until (after a time lapse of about 200 nsec) a shock wave ensues. The amplitude dependence of the velocity of the shock wave was measured and plotted for different longitudinal components of the constant field. In the case of a permanently magnetized ferrite filling having the azimuthal field component combined with the longitudinal, disruptions developed under certain conditions at the front as well as at the trailing edge

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L 15710-65
ACCESSION NR: AP5000317

and within a certain time interval, after which the jumps began to diminish. The phenomenon, however, was not ascribed to evolution of a simple wave; the discontinuities appeared at the very entrance to the waveguide at certain values of the current in the axial conductor of the waveguide due to an irreversible change of magnetization caused by increasing amplitudes of spin waves. The experiments with non-magnetized ferrite confirmed the earlier results obtained by Ostrovskiy (Zhurnal teknicheskoy fiziki, v. 33, 1963, 1080) who assumed that changes in the mean azimuthal magnetization are caused by non-coherent rotation. After a certain time interval, a steepening of the wave front sets in, due to dissipation. The ensuing shock wave is structurally similar to a stationary shock wave. The shock wave front structure is discussed at length under various experimental conditions and with reference to earlier works on the problem. Orig. art. has: 9 figures.

ASSOCIATION: Radiofizicheskiy institut Gor'kovskogo gosudarstvennogo universiteta (Institute of Radiophysics, Gor'kiy State University)

Card 3/4

L 15710-65
ACCESSION NR: AP5000317

SUBMITTED: 03Jun64 ENCL: 00 SUB CODE: MS, EM

NO REF SOV: 016 OTHER: 000 ATD PRESS: 3144

Card 4/4

L 48091-65 EWA(k)/FBD/EWG(r)/EWT(l)/EWP(e)/EWT(m)/EEC(k)-2/EWP(i)/EEC(t)/T/EEC(b)-2/EWP(k)/EWA(m)-2/EWA(h) Pn-4/Pn-4/Po-4/Pf-4/Peh/Pi-4/Pl-4 SCTB/IJP(c) WG

ACCESSION NR: AP5010679 UR/0141/65/008/001/0070/0080

AUTHOR: Bespalov, V. I.; Gaponov, A. V. 65 64 B

TITLE: Statistical characteristics of automodulation of solid-state laser emission

SOURCE: IVUZ. Radiofizika, v. 8, no. 1, 1965, 70-80

TOPIC TAGS: solid laser, statistical property, two level laser, relaxation time, laser automodulation, laser spike sequence, laser spike intensity

ABSTRACT: The authors consider the influence of spontaneous emission on the behavior of a system of two-level objects with different times of longitudinal (T_1) and transverse (T_2) relaxation situated in a single-mode resonator ($T_2 \ll T_1$), where T_1 characterizes the lifetime at the upper level and T_2 the relaxation time of the dipole moment. The purpose of the investigation was to ascertain the causes of violation of the periodicity of the automodulation, which in turn affects the periodicity of the sequence of spikes in ruby lasers. The steady-state oscillations in a laser without regard to fluctuations are first investigated in the phase plane for stability, followed by a study of the effect of spontaneous emission.

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L 48091-65
ACCESSION NR: AP5010679

An expression is derived for the intensity at the maximum of the first spike and the statistical characteristics of a sequence of spikes is analyzed. The results show that spontaneous emission leads on the average to faster attenuation of the modulation of the emission during the transient time. It is shown that the maximum power in solid-state laser spikes is logarithmically related to the intensity of the spontaneous emission. Orig. art. has: 5 figures and 31 formulas. [02]

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete (Scientific Research Radiophysics Institute at Gor'kiy University)

SUBMITTED: 05May64 ENCL: 00 SUB CODE: EC

NR REF SOV: 005 OTHER: 005 ATD PRESS: 4002

Card 2/2

L 49248-65 EWT(l)/EWP(m)/EWA(d)/EPR/FCS(k)/EWA(h)/EWA(c) Pd-1/Pi-4 WW

ACCESSION NR: AP5010806 UR/0057/65/035/004/0677/0689

AUTHOR: Belyantsev, A.M.; Gaponov, A.V.; Freyiman, G.I. 44 B

TITLE: On the structure of electromagnetic shock fronts in nonlinear transmission lines

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 4, 1965, 677-689

TOPIC TAGS: shock wave, shock front structure, electromagnetic wave, nonlinearity, transmission line

ABSTRACT: Stationary solutions of the telegraphic equation with nonlinear parameters are discussed in general terms. The system is specified by a pair of nonlinear functionals giving the linear densities of charge and flux in terms of the current and potential. Most attention is given to stationary shock waves, i.e., to disturbances that propagate at constant velocity with unchanged form but with different asymptotic values of the current far in front and far behind. Conditions are derived for the existence of shock waves in two-conductor transmission lines. Several simple specific cases, representative of general types of transmission line,

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ACCESSION NR: AP5010806

are discussed in more detail and the solutions are obtained. These include transmission lines with space dispersion (i.e., for which the defining functionals contain derivatives with respect to the coordinate measured along the transmission line), and lines exhibiting certain peculiarities that can be realized by the use of ferrites. Orig. art. has: 40 formulas and 8 figures.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete im. N.I.Lobachevskogo (Radiophysics Scientific Research Institute at Gorkiy University)

SUBMITTED: 22Jul63 ENCL: 00 SUB CODE: EM

NR REF SOV: 010 OTHER: 002

Card 2/2

L 49247-65 EWT(1)/EWP(m)/EWA(d)/EPR/FCS(k)/EWA(h)/EWA(c) Pd-1/Pi-4 -WW

ACCESSION NR: AP5010807 UR/0057/65/035/004/0690/0704

AUTHOR: Belyantsev,A.M.; Gaponov,A.V.; Freydman,G.I. 46 43 B

TITLE: On the structure of shock waves in nonlinear transmission lines with delayed excitation of internal degrees of freedom

SOURCE: Zhurnal tekhnicheskoy fiziki, vol.35, no. 4, 1965, 690-704

TOPIC TAGS: shock wave, shock front structure, electromagnetic wave, transmission line, nonlinearity, nonlinear differential equation

ABSTRACT: This paper is a sequal to the preceding paper (ZhTF, 34, 677, 1965 /see abstract AP5010806/) in which the authors discussed solutions of the telegraphic equation with nonlinear parameters. In the present paper the authors discuss transmission lines for which the nonlinear functionals giving the charge and flux densities in flux densities in terms of the current and potential involve two very different time constants. Methods are developed for the approximate separate treatment of the slow and fast processes. It is shown that the approximate equations containing only the slow processes have discontinuous solutions corresponding to shock waves when and only when the phase space contains

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ACCESSION NR: AP5010807

singular surfaces of a certain type. The important features of the discontinuous solutions can be determined from these singular surfaces, and the structure of the continuous shock wave can be subsequently calculated by including the fast processes. Several special cases are discussed in considerable detail. An oscillogram is presented of the shock front in a transmission line involving a saturating ferrite inductance and two RC shunt circuits with 1 and 20 μsec time constants; this oscillogram illustrates features of the calculated shock front structure. Orig. art. has: 29 formulas and 12 figures.

ASSOCIATION: Nauchno-issledovatel'skiy radiofizicheskiy institut pri Gor'kovskom universitete im. N.I.Lobachevskogo (Radiophysics Scientific Research Institute, Gor'kiy University)

SUBMITTED: 03Jan64 ENCL: 00 SUB CODE: EM

NR REF SOV: 006 OTHER: 002

Card 2/2

L 13136-66 EWT(1)/EWA(h)

ACC NR: AP6000741 SOURCE CODE: UR/0386/65/002/009/0430/0435

AUTHOR: Gaponov, A. V.; Gol'denberg, A. L.; Grigor'yev, D. P.; Orlova, I. M.; Pankratova, T. B.; Petelin, M. I.

ORG: Gor'kiy Scientific Research Radiophysics Institute (Gor'kovskiy nauchno-issledovatel'skiy radiofizicheskiy institut)

59

TITLE: Induced synchrotron radiation of electrons in cavity resonators 25

B

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 9, 1965, 430-435

TOPIC TAGS: microwave technology, cavity resonator, microwave plasma, maser radar

ABSTRACT: The authors describe the elements of apparatus (Fig. 1) aimed at increasing the total induced synchrotron radiation power by increasing the volume of the "active medium" (cross section of the electron beam or the volume of the nonequilibrium magnetoactive plasma), through the use of quasioptical electrodynamic systems of the "open" type. Some results are presented of observation of coherent synchrotron radiation of helical electron beams in "open" cavity resonators of sufficiently large volume. Self-excitation (generation) of electromagnetic oscillations at the electron gyrofrequence (magnetic field H_0 = 3200 oe, λ = 3.4 cm) was observed in a resonator constituting a 20 cm section of rectangular waveguide (TE_{011} mode). The electron beam was introduced at the maximum of the electric field from the end, through a waveguide biased beyond cutoff. The second, open end of the cavity was connected with a large-section waveguide used to extract the energy and to serve simultaneously as a collect-

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2

L 13136-66

ACC NR: AP6000741

or. The power of the generated radiation increased monotonically with increasing electron rotation velocity and with decreasing longitudinal velocity, and also with increasing electron current. At $\omega \approx \omega_H$ (ω = radiation frequency, ω_H = electron gyrofrequency) the power obtained was 6 w at current 80 ma and beam voltage 8 kv, while at $\omega \approx 2\omega_H$ the power was 190 w at 320 ma and 19 kv. Further increase in power was hindered by difficulties in cooling the generators. Furthermore, a gyroresonance discharge was produced in the residual gas in the apparatus with $\omega \approx \omega_H$. The same causes kept the electron efficiency from reaching the theoretically predicted value of 19%. In experimental maser models with trochoidal electron beams and traveling waves, the efficiency reaches 10--15%. Orig. art. has: 3 figures and 1 formula.

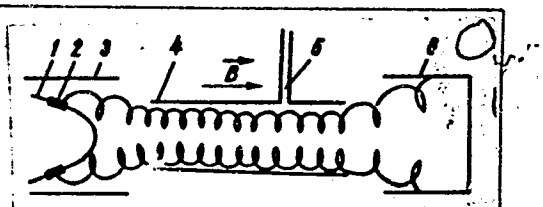

Fig. 1. Schematic diagram of oscillator using induced electron synchrotron radiation. 1 - Cathode, 2 - emitting surface, 3 - anode, 4 - resonator, 5 - high-frequency power output, 6 - collector, B - static magnetic field.

SUB CODE: 20/ 17/ SUBM DATE: 09Sep65/ ORIG REF: 007/ OTH REF: 004

Card 2/2 MW

ACC NR: AP7004911 SOURCE CODE: UR/0109/66/011/012/2254/2257

AUTHOR: Antakov, I. I.; Gaponov, A. V.; Malygin, O. V.; Flyagin, V. A.

ORG: none

TITLE: The use of induced cyclotron emission of electrons for generating and amplification of electromagnetic oscillations

SOURCE: Radiotekhnika i elektronika, v. 11, no. 12, 1966, 2254-2257

TOPIC TAGS: maser, maser theory, cyclotron frequency, cyclotron resonance, electron beam, electromagnetic wave

ABSTRACT:
The design characteristics and the results of an experimental investigation of devices termed cyclotron resonance masers because of induced cyclotron emission are discussed. The cyclotron emission is caused by the interaction of a trochoidal electron beam with a traveling electromagnetic wave (either direct or backward with respect to the electron beam) at a frequency corresponding to the normal Doppler effect, i.e., at $w = w_n (1 \pm (v_0/v_{ph}))^{-1}$, where v_0 is the mean electron velocity, and v_{ph} is the phase velocity of waves in the direction of the mean electron velocity.
A schematic drawing of an M-type cyclotron resonance maser (with crossed E and H fields), designed to operate in the 8-mm waveband, is shown in Fig. 1. The interaction space in this maser is formed by the anode (3) and the cathode plate (2) both of which act as conductors in a plane

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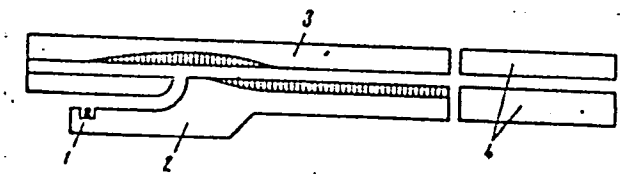

Fig. 1. Schematic drawing of the cyclotron resonance maser

1 - Cathode; 2 - cathode plate; 3 - anode; 4 - collector.

comb-shaped two-wire line. Dimensions of the comb-shaped line are chosen so as to assure the propagation, in the operating frequency range, of a symmetrical E wave with $v_{ph} = 0.8\ c$, where c is the speed of light in vacuum.

The basic characteristics of the backward wave maser (oscillator) are shown in Figs. 2 and 3. The oscillation frequency of the maser is proportional to the magnetic field strength and approaches the cyclotron frequency of electrons. A change in output power in the tuning range is determined chiefly by a change in the stored rotating energy of the beam electrons. The highest efficiency of the backward wave maser was fixed at 10% ($P_{out} = 800\ w_1$ at $I_o = 0.6$ amp, and $U_{anode} = 14$ kv) without regeneration. The direct wave maser (amplifier), according to preliminary experiments, had an efficiency of about 25% for an output power of 750 w and a gain of 10 db. The amplifier band width, as determined by the width of the cyclotron resonance line, was about 300 Mc. Orig. art. has: 2 figures and 1 formula.

 [JR]

ACC NR: AP7004911

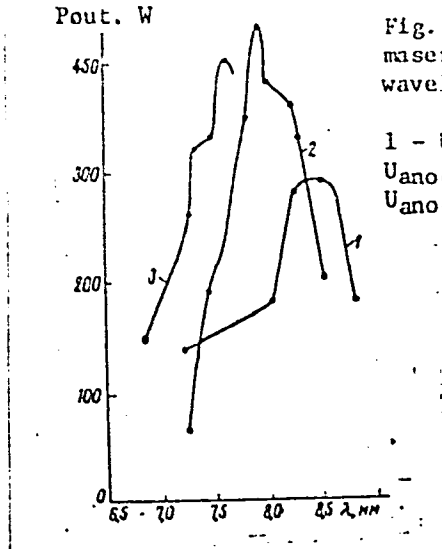

Fig. 2. Dependence of the maser generated power on wavelength at I_0 = 0.4 amp

1 - U_{anode} = 10 kv; 2 - U_{anode} = 11 kv, 3 - U_{anode} = 12 kv.

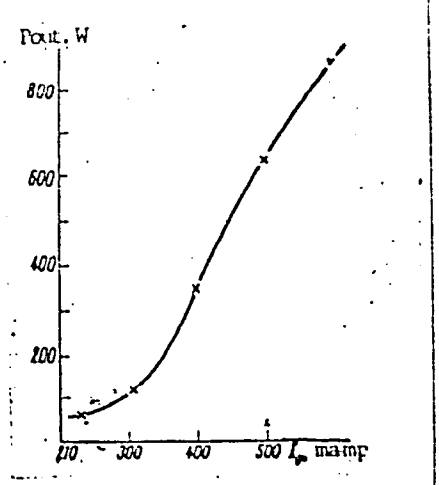

Fig. 3. Dependence of the generated power on the beam current at U_{anode} = 14 kv and λ = 7.9 mm

SUB CODE: 20 / SUBM DATE: 27Jan66/ ORIG REF: 008/
OTH REF: 002/ ATD PRESS: 5115

Card 3/3

GAPONOV, D.D.

Mechanization of loading and unloading operations in food warehouses in France. Sakh. prom. 33 no.11:76 N '59 (MIRA 13:3)
(France--Loading and unloading)

GAPONOV, D.D.

Ciculating pump. Sakh.prom. 34 no.7:73-74 Jl '60. (MIRA 13:7)
(France--Pumping machinery)

GAPONOV, G. (Zaporozh'ye)

Device for the "Leningrad" enlarger. Sov.foto 19 no.7:48 Jl '59.
(MIRA 12:11)

(Photography--Enlarging)

GAPONOV, M. (Rostov-na-Donu)

There are only three ultrashortwave radio stations in Rostov.
Radio no.1:9 Ja '56. (MLRA 9:4)
(Rostov-on-Don--Radio stations, Shortwave)

ACC NR: AT7001904 (N) SOURCE CODE: UR/3000/66/000/013/0104/0114

AUTHOR: Sogrishin, Yu. P. (Candidate of technical sciences); Gaponov, M. A. (Engineer); Zhuchenko, A. N. (Engineer)

ORG: none

TITLE: The problem of selecting tool steels for high-speed pressure working of metals

SOURCE: Moscow. Eksperimental'nyy nauchno-issledovatel'skiy institut kuznechno-pressovogo mashinostroyeniya. [Nauchnyye trudy] no. 13, 1966. Shtampovyye stali (Tool steels), 104-114

TOPIC TAGS: metal forming, high energy rate forming, hot die forming, alloy steel, hot die steel/5KhNM steel 3Kh2V8F steel, 4Kh5V2FS steel

ABSTRACT: 5KhNM, 3Kh2V8F and 4Kh5V2FS hot die steels were tested for their suitability as die materials in hot high energy rate forming of parts from AK6 aluminum alloy St.45 carbon steel, VT1 titanium and nickel-base EI437B [U.S. Nimonic 80A] alloy. The test results showed that 4Kh5V2FS steel was the most suitable for intricate dies for high-speed forming of complex parts with thin, high fins (85% reduction). The 4Kh5V2FS steel contains 0.35—0.45%C, 0.8—1.2% Si, 0.35% Mn, 4.5—5.5% Cr, 1.6—2.4% W, 0.8—1.2% V, the remainder—Fe. Quenched from 1050C and tempered at

Card 1/2 UDC: none

ACC NR: AT7001904

580C, 4Kh5V2FS steel has a tensile strength of 1830 Mn/m^2, a yield strength of 1629 Mn/m^2, an elongation of 9.5%, a reduction of area of 42.5%, an impact toughness of 340 kj/m^2 and an HRC hardness of 49. The 4Kh5V2FS steel dies had a high thermal shock resistance, a satisfactory wear resistance and service life. 5KhNM steel worked satisfactorily only in forming of aluminum-alloy parts, but failed in forming titanium and steel parts. The main shortcomings of this steel were a low tensile strength (1300 Mn/m^2) and a low thermal shock resistance. 3Kh2V2F steel was also unsuitable for steel parts of an intricate form because of a low ductility and impact toughness and a poor thermal shock resistance.

Orig. art. has: 5 figures and 4 tables.

SUB CODE: 13/ SUBM DATE: none/ ORIG REF: 002/ OTH REF: 005/ ATD PRESS: 5112

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Card 2/2

GAPONOV, N.

Automotive transportation in the Moldavian S.S.R. during the last 40 years. Avt. transp. 42 no.10:4-5 O '64.
(MIRA 17:11)

1. Ministr avtotoransporta i shosseynykh dorog Moldavskoy SSR.

GAPONOV, N. N. (Post-graduate student, Moscow Veterinary Academy)

"Results of examinations of the abomasum contents in healthy calves and in those with dyspepsia"

Veterinariya, vol. 39, no. 4, April 1962 p. 81

GAPONOV, N.N.

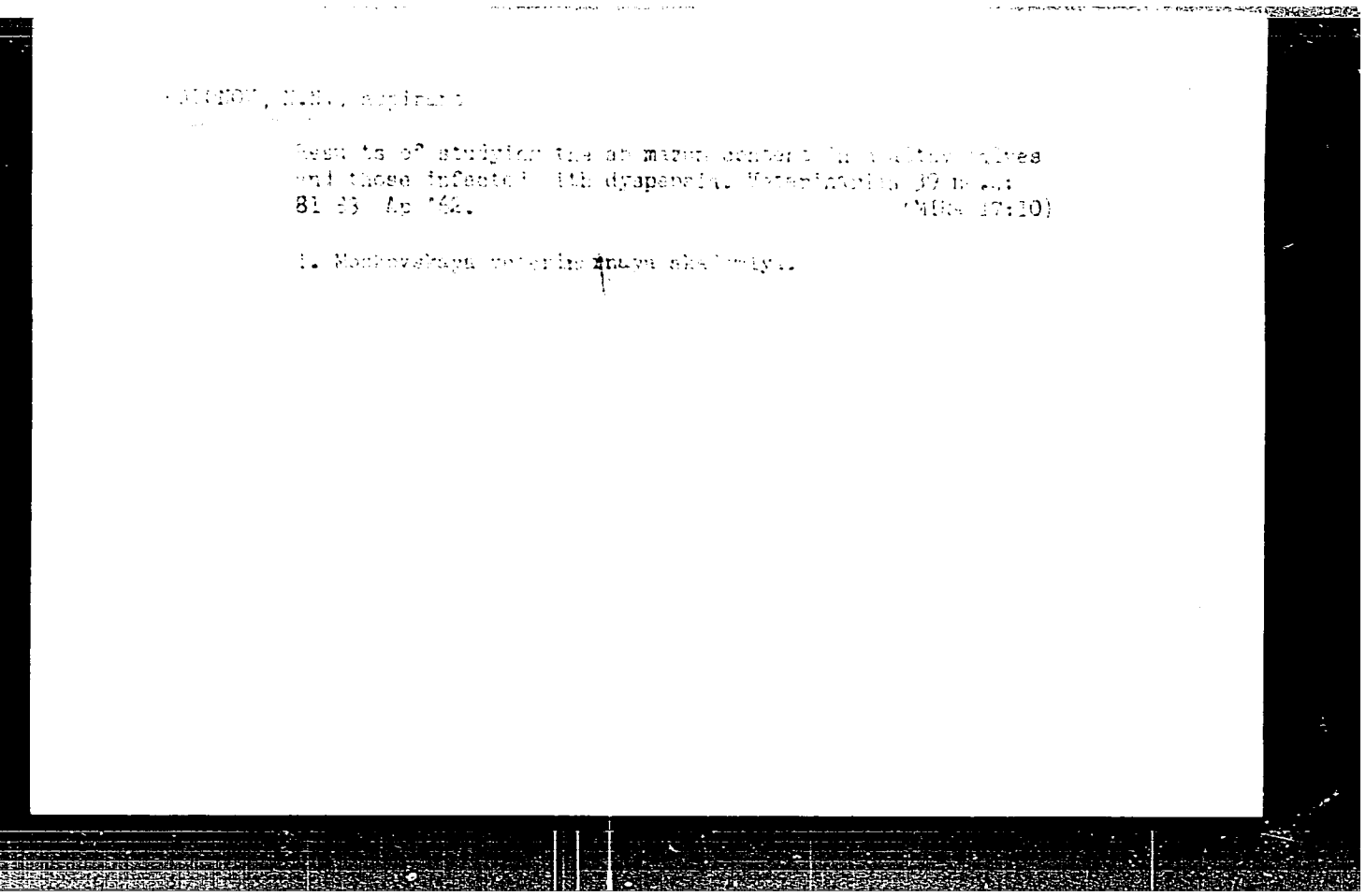
Methods of obtaining the abomasum contents of calves. Veterinariia 40 no.8:61 Ag '63. (MIRA 17:10)

1. Ryazanskiy sel'skokhozyaystvennyy institut imeni Kostycheva.

GAPONOV, N.V., DONIGEVICH, M.I. (Chernovtsy, ul. Pokryshkina, d.11, kv.2)

Universal stretcher with a rigid bottom. Nov.khir. arkh. no.3:116-117 My-Je '58 (MIRA 11:9)

1. Chernovitskaya stantsiya sanitarnoy aviatsii (zav. M.I. Donigevich). (LITTERS)



[redacted], I.L., [redacted]; [redacted], N.I., [redacted]; [redacted], [redacted], inzh.

Chromium carbide alloy for the hard facing of metallurgical equipment parts. Svar. proiz. no.6:20-21 Je '65. (MIRA 18:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut organizatsii proizvodstva i truda chernoy metallurgii (for Zaboyenko, Sherman). 2. Zavod "Krivorozhstal'" (for Gaponov).

GAPONOV, P.

A worthy replacement. Sov.profsoiuzy 7 no.15:21 Ag '59.
(MIRA 12:12)

1. Sekretar' Bryanskogo oblsovprofa.
(Bryansk--Woolen and worsted manufacture)

BELOV, Ivan Vasil'yevich; ORANZHEREYEVA, Valentina Fedorovna; NARTSISSOVA, Nina Vasil'yevna; GAPONOV, Petr Ivanovich; BEZDOL'NYY, Konstantin Iosifovich; LUKASHUK, V.A., red.; KOROBOVA, N.D., tekhn. red.

[For the aid of Scientific and Technical Society's activist group; collected leading materials] V pomoshch' aktivu NTO; sbornik rukovodiashchikh materialov. Moskva, Profizdat, 1963. 422 p. (MIRA 17:3)

GAPONOV, P.I.

Financial operations of an initial organization of the society. NTO 6 no.6:52-54 Je '64. (MIRA 17:8)

1. Zaveduyushchiy finansovym otdelom Vsesoyuznogo soveta nauchno-tekhnicheskikh obshchestv.

GAPONOV, P. S.

Information on gas defense. A text book for river-fleet workers. Moskva, Izd-vo Narkomrechflota SSSR, 1944. 81 p. (51-48520)

UG447.G33

GROMADCHENKO, A., gorod shakhty, Rostovskoy oblasti; GAPONOV, S., predsedatel', gorod Rudnya, Smolenskoy oblasti; VAYTULEVICH, T., Leningrad; BONDAREV, A., predsedatel', Melovatskiy rayon, Voronezhskoy oblasti.

From the editor's mail. Voen.znan. 29 no.9:7 S '53. (MLRA 6:12)

1. Rayonnyy orgkomitet Vsesoyuznogo dobrovol'nogo obshchestva sodeystviya aviatsii (for Gaponov). 2. Rayonnyy orgkomitet Vsesoyuznogo dobrovol'nogo obshchestva sodeystviya aviatsii (for Bondarev). (Military education)

GAPONOV, V., inzh.

Requirements for garage equipment. Avt.transp. 36 no.8:23-24 Ag '58.
(MIRA 11:9)
(Garages)

GAPONOV, V.; STEPANCHUK, T.

Retracing the steps to a heroic deed. Kryl.rod. 11 no.2:19 F '60. (MIRA 13:6)

(Borodkin, Stepan Romanovich, 1906-1943)

GAPONOV, V.; MITROFANOV, N.

Heroic deed. Kryl.rod. 13 no.1:13 Ja '62. (MIRA 15:2)
(World War, 1939-1945—Aerial operations)

GAPONOV, V.; Prinimal uchastiye: GUREVICH, L.A., nauchnyy sotrudnik

From war documents. Kryl.rod. 13 no.11:18-19 N '62.
(MIRA 15:12)
(World War, 1939-1945—Aerial operations)

GAPONOV, V.

Fighting for technical development. Avt.transp. 39 no.9:5-6 S '61. (MIRA 14:10)
(Leningrad Province--Transportation, Automotive)

VINOGRADOV, A.; GAPONOV, V.; VOLOSHIN, A., inzh.; PUSHKIN, D., instruktor; IGNATENKO, N.; IVANOV, A.; MALANCHENKO, I.; BUBLEY, Ye.; SHABAD, M.

Readers' letters. NTO 3 no.8:54-55 Ag '61. (MIRA 14:9)

1. Chlen byuro avtodorozhnoy sektsii Leningradskogo oblastnogo pravleniya Nauchno-tekhnicheskogo obshchestva gorodskogo khozyaystva i avtotransporta (for Gaponov). 2. TSentral'noye pravleniye Nauchno-tekhnicheskogo obshchestva mukomol'noy i krupyanoy promyshlennosti i elevatornogo khozyaystva (for Pushkin). 3. Predsedatel' Belgorodskogo oblastnogo pravleniya Nauchno-tekhnicheskogo obshchestva pishchevoy promyshlennosti (for Ignatenko). 4. Predsedatel' soveta pervichnoy organizatsii Nauchno-tekhnicheskogo obshchestva "Lenenergo" (for Shabad).

(Technological innovations)

GAPONOV, V.

Petr Nesterov was the first. Kryl. rod. 15 no.9:8 S '64.
(MIRA 18:1)

GAPONOV, V.; ZAYTSEV, A.

The invincible fund of the people. Kryl. rod. 16 no.3:9 Mr '65.
(MIRA 18:5)

GAPONOV, V., podpolkovnik; ZAYTSEV, A., podpolkovnik

All for the front, all for the victory. Av. i kosm. 47 no.5:54-58 My '65. (MIRA 18:4)

GUSHOV, V.

Regimental commander. Kryl. rod. 16 no.5:6-7 My '65.

(MIRA 18:6)

L 04675-67 EWT(m) IJP(c)
ACC NR: AP6018348 SOURCE CODE: UR/0089/66/020/005/0385/0392

AUTHOR: Abramyan, Ye. A.; Gaponov, V. A.

ORG: none

TITLE: Strong-current accelerator based on a transformer

SOURCE: Atomnaya energiya, v. 20, no. 5, 1966, 385-392

TOPIC TAGS: focusing accelerator, particle accelerator component, pulse transformer/ ElT-1.5 accelerator

ABSTRACT: The article describes the operating principle of a direct-action accelerator, constructed at the initiative of G. I. Budker at the Institute of Nuclear Physics of the Siberian Department AN SSSR, and designated ElT-1.5 (electronic transformer for acceleration of electrons up to 1.5 Mev energy) (Fig. 1). The average beam power reaches 25 kW, and the efficiency approximately 90%. The electron-current pulse duration is adjustable from 0 to 5 msec, and the repetition frequency is adjustable to 50 cps. The average current (17 mA) can reach 1/6 the maximum pulsed current. Magnetic lenses installed inside the tube make it possible to raise the current to 100 mA in a beam of 5 mm diameter. Shields made of heavy metal, located near the tube axis, protect the gas gaps and other electrically charged parts against radiation. Detailed descriptions are presented of the operating principle and features of the transformer, the installation parameters, the automatic control system, and the preliminary experimental results. The beam sweep was in two directions, at angles ±2.5 and ±25°. The maximum short-duration average power was ~30 kW. The test results confirmed the cor-

Card 1/3 UDC: 621.384.60

L 04675-67
ACC NR: AP6018348

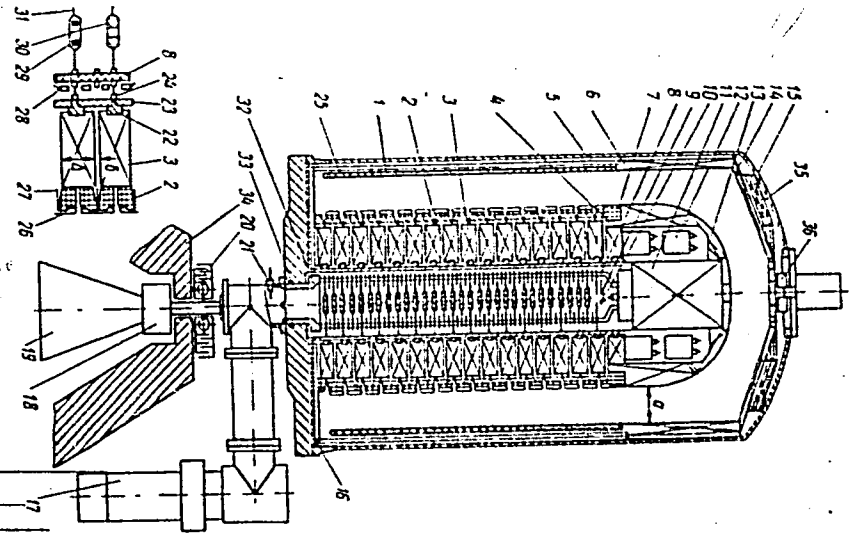


Fig. 1. Diagram of apparatus. 1,2 - Transformer windings, 9 - control electrode, 10 - injector.

rectness of the design. Ways of improving the efficiency and increasing the electron energy are discussed. The authors thank the staff members of the Institute of Nuclear physics of the Siberian Department AN SSSR for taking part in the construction and adjustment of the apparatus, namely engineers G. Kraynov, V. Nikolayev, and I. Shalashov, mechanics V. Biryukov, G. Balykov, M. Voronov, M. Gubin, Yu. Yefremenkov, A. Kosachev, and M. Stepanov, and technician V. Kirov. Orig. art.

Card 2/3

L 04675-67
ACC NR: AP6018348

has: 6 figures and 5 formulas.

SUB CODE: 20/ SUBM DATE: 24Jan66/ ORIG REF: 001/ OTH REF: 001

kh

Card 3/3

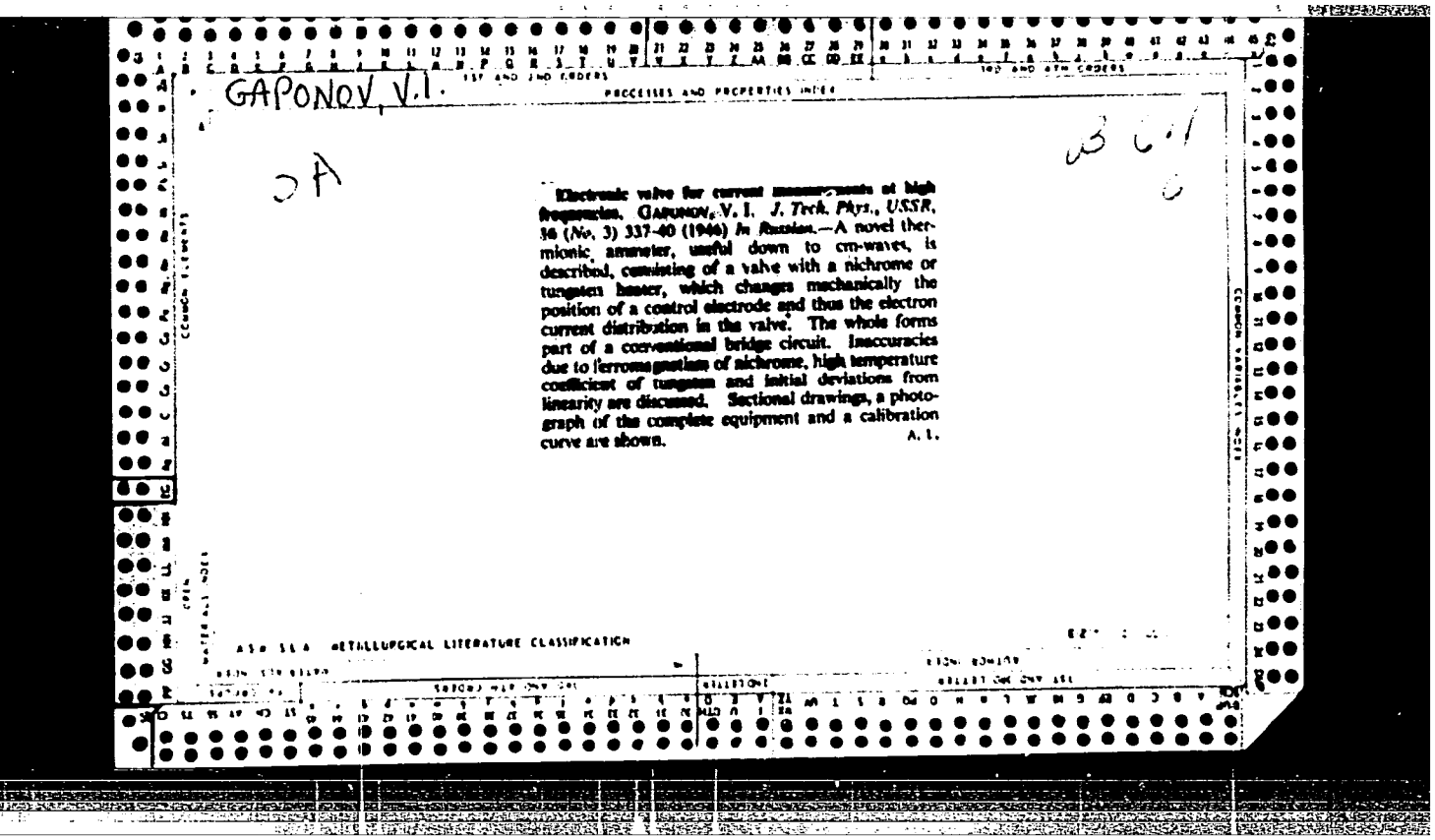
GAPONOV, V. I.

CU

2

Influence of mechanical deformation on the Curie point of nickel, and on the relation between its magnetization and temperature. V. I. Gaponov. *Vestnik Elektrotekh.* (Moscow) 1930, No. 2-3, 29-33.—The displacement of the Curie point under a pull of 38 kg./sq. mm. is smaller than 0.3°, which is obviously in contradiction to Weiss' formula. A series of curves is given showing effect of deformation on the relation between magnetization of Ni and temp. S. I. Maiorsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



GAPONOV, V.I.

3A

Electronic valve for current measurements at high frequencies. GAPONOV, V. I. *J. Tech. Phys., USSR*, 16 (*No.* 3) 337-40 (1946) *In Russian.*—A novel thermionic ammeter, useful down to cm-waves, is described, consisting of a valve with a nichrome or tungsten heater, which changes mechanically the position of a control electrode and thus the electron current distribution in the valve. The whole forms part of a conventional bridge circuit. Inaccuracies due to ferromagnetism of nichrome, high temperature coefficient of tungsten and initial deviations from linearity are discussed. Sectional drawings, a photograph of the complete equipment and a calibration curve are shown. A. I.

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

GAPONOV, V. I.

Electrons Moskva, Gos. izd-vo tekhniko-teoret. lit-ry, 1949. 47 p. (Nauchno-populiarnaia biblioteka) (51-22315)

QC721.G33

GAPONOV, Viktor Ivanovich; BRAGINSKIY, V.B.; MURASHOVA, N.Ya., tekhn.red.

[Electronics] Elektronika. Moskva, Gos.izd-vo fiziko-matem. lit-ry. Pt.2. [Electron-tube and semiconductor devices] Elektrovakuumnye i poluprovodnikovye pribory. 1960. 592 p. (MIRA 14:4)

(Electron tubes) (Transistors)

PHASE I BOOK EXPLOITATION SOV/5430

Gaponov, Viktor Ivanovich

Elektronika. ch. 1: Fizicheskiye osnovy (Electronics. pt.1: Physical Principles) Moscow, Fizmatgiz, 1960. 516 p. 25,000 copies printed.

Ed.: V.B. Braginskiy; Tech. Ed.: N.Ya. Murashova.

PURPOSE: This book has been approved by the Ministry of Higher and Secondary Specialized Education, RSFSR, as a textbook for use in schools of higher education.

COVERAGE: The book presents the description and theory of physical phenomena which play an important role in operations of electron vacuum and semiconductor devices. The reader is assumed to have a knowledge of physics equivalent to the general course in schools of higher education. More advanced material on the physics of electron vacuum devices, such as certain calculations of electric and magnetic fields, is given in the appendixes. The contents of the book correspond to the course on general electronics in radiophysics divisions in universities. The author believes this textbook may also be useful to physicists

Card 1/5

in other fields, industrial engineers, and students of electrical and radio engineering. The help of the following persons is acknowledged: N. I Ionov, Professor, R.A. Nilender, Professor, B.M. Tsarev, Professor, and V.B. Braginskiy. The author utilizes drawings from other books, particularly from "Elektronnyye i ionnyye pribory" (Electron and ion devices), by V.S. Grigor'yev and B.S. Grigor'yev. References to each chapter are listed separately in the bibliography. There are 113 references: 105 Soviet (including 5 translations), 4 English, 2 French, and 2 German.

TABLE OF CONTENTS:

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Ch. I. Motion of Charged Particles in Electric and Magnetic Fields 7
1. Electron ballistics and electron optics 7
2. Motion of charged particles in uniform fields 21
3. Deflection and focusing of charged particles in uniform and plane fields 31

PHASE I BOOK EXPLOITATION SOV/5257

Gaponov, Viktor Ivanovich

Elektronika. Ch. II: Elektrovakuumnyye i poluprovodnikovyye pribory (Electronics. Pt. 2: Electron Vacuum and Semiconductor Devices) Moscow, Fizmatgiz, 1960. 592 p. 25,000 copies printed.

Ed.: V. B. Braginskiy; Tech. Ed.: N. Ya. Murashova.

PURPOSE: This book has been approved by the Ministry of Higher and Secondary Specialized Education of the RSFSR as a textbook for use in schools of higher education.

COVERAGE: The author discusses the design, structure, and operation of several electronic vacuum devices used in radio engineering and related fields. The phenomena and processes described are supported by mathematical analysis and illustrated by numerous sketches, graphs, and tables. No personalities are mentioned. References to each chapter are listed separately in the Bibliography. There are 190 references: 177 Soviet (including 21 translations), 10 English, 2 German, and 1 French.

Card ~~1/5~~

GAPONOV, V.I., dotsent (Gor'kiy)

"Mysteries of electrons" by G.Leonidov. Reviewed by V.I.Gaponov. Fiz.v shkole 21 no.4:105-106 Jl-Ag '61. (MIRA 14:10)
(Electrons)

GAPONOV, V.V. (Leningrad)

Displacements of a shifting ground being in a limiting equilibrium [with summary in English]. Prykl. mekh. 5 no.1:65-74 '59.
(MIRA 12:6)

1. Leningradskiy proyektno-doslidniy institut transportnogo budivnitstva.
(Soil mechanics)

GAPOLOV, V. V., Cand Tech Sci -- (diss) "Concerning the question on movements in a free-flowing medium found in a state of maximum equilibrium," Moscow, 1960, 9 pp, (Institute of Mechanics, Academy of Sciences USSR)
(KL, 38-60, 108)

GAPONOV, Ya.G.

Automatic charging of rotary kilns. Ogneupory 28 no.1:21-22 '63. (MIRA 16:1)

1. Zavod "Magnezit".
(Refractory materials) (Kilns, Rotary)

GAPONOV, Ya.G.

Automatic control of the charging of rotary kilns operating on the slurry method. Ogneupory 28 no.3:105-106 '63. (MIRA 16:2)

1. Zavod "Magnezit".
(Refractory materials) (Kilns, Rotary)

GAPONOV, Ye., polkovnik, delegat XXII s"yezda Kommunisticheskoy partii Sovetskogo Soyuza; FEDOSEYEV, S., polkovnik; ALEKSANDROV, O., mayor

Discipline of flight. Vest. Vozd. Fl. no.11:41-49 N '61.
(MIRA 15:2)

(Russia--Air force)

GAPONOV, Ye., polkovnik

All our efforts should serve to increase the combat readiness.
Av.i kosm. 45 no.8:72-73 '62. (MIRA 15:8)
(Aeronautics, Military)

15-1957-10-13709

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 10, p 42 (USSR)

AUTHORS: Gaponov, Ye. A., Pazyuk, L. I., Gerun, A. F., Stepanov, V. V.

TITLE: The Geologic History of the Accumulation of the Sedimentary Formations in the Valley of the Dnepr River Along the Kakhovka Section (Geologicheskaya istoriya nakopleniya osadochnykh obrazovaniy v doline r. Dnepra po Kakhovskomu poperechniku)

PERIODICAL: Tr. Odessk. un-ta, 1955, vol 145, pp 7-24

ABSTRACT: The sedimentary formations consist of alluvial deposits of the ancient Dnepr, and pre-estuary, estuary, and modern alluvial deposits. They lie on disturbed underlying rocks of Sarmatian age. The channel of the ancient Dnepr was gradually deepened, from the right bank to the left, as a result of increased erosive activity following the uplift of the nearby land mass in Novoevkinskoye (late Euxine) time. This ancient alluvium of the

Card 1/3

15-1957-10-13709

The Geologic History of the Accumulation of the Sedimentary Formations in the Valley of the Dnepr River Along the Kakhovka Section

Dnepr is represented by two phases: swift water and bottom layer. The deposits are gravels and quartz sands, with occasional layers and lenses of clay. Shell fragments of Lithoglyphus naticoides c. Pf. are common is these rocks. The pre-estuary deposits are channel sediments and were formed by swift water. These are fine-grained, partly varigrained, quartz sands, with layers of argillaceous sands and, more rarely, sandy clays, which contain fresh-water and brackish-water molluscs: Dreissensia polymorpha Pall., Theodoxus fluviatilis, Bithynia tentaculata, Paludina fasciata, Lithoglyphus naticoides c. Pf., and others). The accumulation of the estuary deposits occurred when the land mass of this area had reached maximum subsidence. The deposits accumulated in an open estuary and were accompanied by the deposition of organic material. The estuary deposits consist chiefly of muddy, sandy clays with Monodacna colorata Eichw., Micromelania lincta Milasch., Theodoxus fluviatilis L., Bithynia tentaculata L., Lithoglyphus naticoides c. Pf., and

Card 2/3

GAPONOV, Ye.A.

Teeth of the left part of the maxilla of a dinothere from Maskoshnoye. Trudy Od. un. 152 Ser. geol. i geog. nauk no.8:7-16 '62

Maxillary teeth of the dinothere based on finds in the northern parts of Odessa Province. Ibid.:17-22 (MIRA 17:9)

YATSKO, I.Ya.; GAPONOV, Ye.A., prof., otv.red.

[Continental facies of the upper Neogene in the southern part of the Ukrainian S.S.R. and their unionids] Kontinental'nye fatsii v verkhnem neogene iuga USSR i ikh unionidy. Odessa, 1959. 99 p. (Odessa. Universitet. Pratsi. Seriia geologicheskikh i geograficheskikh nauk. No.6, (vol. 149) (MIRA 12:8)
(Ukraine--Geology, Stratigraphic)

KOROTKOVA, P.I., nauchnyy sotrudnik; GAPONOV, Ye.P., nauchnyy sotrudnik

Operating conditions of vineyard sprayers. Zashch. rast. ot vred. i bol. 9 no.12:26 '64. (MIRA 18:4)

1. Vserossiyskiy institut vinogradarstva i vinodeliya, Novocherkassk.

GAPONOV, Yu. V. and POPOV, V. S.

"β -γ- Correlation for allowed Transitions involving Non-Conservation of Parity."

Nuclear Physics, Vol. 4, No. 3, 1957 (North Holland Publishing Co. - Amsterdam) p. 453

Abst: The angular correlation between the directions of emission of electron and circularly-polarized γ- quantum in cascade β -γ- transitions is considered for allowed β -transitions, taking account of parity non-conservation. The effect of the nuclear Coulomb field is neglected. (received 16 April 1957)

Moscow State University, USSR

APPROVED FOR RELEASE: 07/19/2001 CIA-RDP86-00513R000514310011-5"

GAPONOV, Yu. V.

AUTHOR GAPONOV, Yu. V., POPOV, V.S. 56-7-37/66

TITLE β-γ-Correlation of Polarized γ-Quanta in the Case of Non-conservation of Parity.
(β-γ-korrelyatsii dlya razreshennykh perekhodov pri nesokhranenii chetnosti.- Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 7, pp 256-259 (USSR).

ABSTRACT The present paper investigates the angular correlation of an electron and a circularly polarized γ-quantum which are emitted in the case of a cascade-like β-γ-transition and nonconservation of parity. The influence exercised by the COULOMB field of the nucleus is neglected. If after β-decay there follows a γ-transition, the probability of emission of a γ-quantum under the angle θ in the direction of emission of the electron is equal to $w(\theta) = 1-(\mu\alpha v/c)\cos\theta$. Here $\mu = \pm 1$ corresponds to the right and left polarization respectively of the γ-quantum. v denotes the velocity of the electron and α a coefficient which depends on the interaction constant, the nuclear moments and the multipole properties of the γ-quantum. An explicit expression is given for the coefficient α. Further, the constants

CARD 1/3

β- γ-Correlation of Polarized γ-Quanta in the Case of Non-conservation of Parity.

56-7-37/66

occurring in this expression are given in detail. The angular distribution is nonisotropic only in the case of nonconservation of parity. If the hypothesis of the longitudinal neutrino is true, the formulae given here obtain a more simple form. The formula given first can be generalized for the case that on the β-decay several successive-transitions follow. The experimental results confirm the fact that certain coefficients occurring in these formulae are equal to zero. Therefore the formulae are simplified considerably; the values of α for several nuclei computed on these assumptions are shown in a table. Further tables contain values of the coefficients occurring in these formulae. In spite of the difficult measuring of the polarization of the γ-quanta the experimental investigation of the here discussed effects is, especially for transitions with $j_2 = j_1$, of advantage. By investigating this effect the properties of the HAMILTONIAN of the β-interaction can be determined.

CARD 2/3

24(5)

AUTHOR: Gaponov, Yu. V.

SOV/56-36-1-26/62

TITLE: The β-γ-Correlation in the First Forbidden β-Transitions (β-γ-korrelyatsiya v β-perekhodakh pervogo zapreta)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 36, Nr 1, pp 193-203 (USSR)

ABSTRACT: The author investigates the β-γ-angular correlation of circularly polarized γ-quanta in the β-transitions forbidden in the first order for an arbitrary mixture of variants in consideration of the Coulomb nuclear field and especially in Coulomb β-transitions. These calculations were carried out both for the angular correlation of an electron with a γ-quantum and for any γ-quantum of the cascade of quanta accompanying the β-decay. An expression is first written down and explained for the probability of the departure of a γ-quantum at an angle θ in the direction of the electron momentum. The herein occurring coefficient γ_R can be calculated for any γ-transition (of the purely electric, purely magnetic and also of the purely mixed type). Next, an expression for the electron wave function is derived. The next chapter deals with

The β-γ-Correlation in the First Forbidden β-Transitions

SOV/56-36-1-26/62

Coulomb transitions, which is of interest especially in connection with the non-conservation of parity with respect to time. Investigation of the energy dependence of the asymmetry coefficient λ in heavy nuclei makes it possible to estimate the contributions made by such terms as are connected with the non-conservation of time parity in β-decay. The following chapter of this paper then deals with the unique transitions $\Delta j = \pm 2$. By comparing the exact formulas derived here with the experiment, it is possible to check the conservation of parity with respect to time in β-decay. The unique β-transitions were experimentally investigated on the nucleus Y^{91}. Investigation of the β-γ-angular correlation of the circularly polarized γ-quanta in β-transitions forbidden in the first order is of interest in the following 2 cases: Coulomb β-transitions in heavy nuclei and unique β-transitions. It appears that only in these cases a simple interpretation of the results obtained by this paper is possible. The author thanks Professor I. S. Shapiro for raising the subject, for his useful advice, and for his constant interest. There are 1 table

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and 10 references, 2 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute for Nuclear Physics of Moscow State University)

SUBMITTED: June 30, 1958

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21 (8)

AUTHOR: Gaponov, Yu. V.

SOV/56-37-1-24/64

TITLE: Second Forbidden Coulomb β-Transitions (Kulonovskiye β-perekhody vtorogo zapreta)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959, Vol 37, Nr 1(7), pp 154 - 158 (USSR)

ABSTRACT: In the present paper, simple rules are derived in order to forecast which nuclear matrix elements will contribute to the β-transitions of a given type. Besides, these rules are used for the estimation of the contributions. On the basis of these rules, the β-transitions forbidden in second order are investigated. There is a simple case of Coulomb β-transitions $\Delta j = 2$ (no) with similar properties as in the unique β-transitions. For this purpose, the β-ν angular correlation and the β-γ correlation with a circularly polarized γ-quantum are determined. In the first part of the present paper, the nuclear matrix elements are calculated. The Hamiltonian function of the β-interaction is chosen in the form suggested by Gell-Mann and Feynman: $H = G\left[\overline{\Psi}_p \gamma_\mu (1+\lambda\gamma_5)\Psi_n\right]\left[\overline{\Phi}_e \gamma_\mu \frac{1}{\sqrt{2}}(1+\gamma_5)\Phi_\nu\right]$. In the Coulomb field of the nucleus with the charge Z, the wave function of the elec-

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tron with the momentum $\vec{p}$, the total energy E, and with the projection ξ of the spin is represented as the sum of two bispinors. All terms of the Hamiltonian function can be classified according to 4 quantum numbers and according to the parity. All terms are divided into 3 groups with respect to their amount: of the ordinary type, of the Coulomb type ($\sim\alpha Z$), and relativistic terms (v_H/c). Each term in the development of the Hamiltonian function can be reduced to a few nuclear matrix elements. Each matrix element is fully characterized by the set of the quantum numbers J,L,S. Besides, this set can be determined from the quantum numbers of the electron and the neutrino according to the rules of vector addition. The second part discusses the second forbidden Coulomb transitions. The contribution of the terms of the Coulomb type increases rapidly with increasing charge of the nucleus so that already in the case of nuclei with $Z \geqslant 30$, all remaining terms can be neglected with respect to the Coulomb terms. Such β-transitions are termed Coulomb β-transitions. The author also calculated the β-ν- and the β-γ angular correlations with a circularly polarized γ-quantum without considering the finite nuclear dimensions. These

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two nuclear matrix elements always occur in the same combination $\sqrt{2}\langle rY_{2M}\rangle_2 + \lambda\langle\gamma\gamma_5 rY_{2M}\rangle_2$ so that this case is similar to the unique β-transitions, the angular-correlation functions of which do not depend on the nuclear matrix elements and can be accurately determined. A formula for the calculation of the β-spectrum of the second forbidden Coulomb transitions is written down. The author thanks Professor I. S. Shapiro for his useful advice and constant interest in the present paper. There are 1 table and 10 references, 2 of which are Soviet.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: January 27, 1959

Card 3/3

SHAPIRO, I.S.; GAPONOV, Yu.V.

Continuous representation of total Green's functions. Vest. Mosk. un. Ser. 3 Fiz., astron 16 no.2:73-81 Mr-Ap '61. (MIRA 14:6)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki, Kafedra yadernoy spektroskopii.
(Boundary value problems)
(Functions, Continuous)

L 16506-65 EWT(m) DIAAP/ESD(dp)/ESD(t)/SSD/AFWL/ASD(a)-5

ACCESSION NR: AP5000339 S/0056/64/047/005/1826/1828

AUTHORS: Gaponov, Yu. V.; Tyutin, I. V.

TITLE: Inelastic scattering of neutrinos by deuterons

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 5, 1964, 1826-1828

TOPIC TAGS: neutrino, deuteron scattering, inelastic scattering, differential cross section

ABSTRACT: In view of the physical feasibility of low-energy experiments dealing with the possible existence of a neutral neutrino current in the universal weak-interaction Hamiltonian, the authors use such a Hamiltonian to estimate theoretically the cross section for the disintegration of the deuteron in inelastic scattering of low-energy neutrinos (the reaction $\nu + d \rightarrow \nu + p + n$) for cases of S and P states of the np pair. Recoil energy is neglected and the

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ACCESSION NR: AP5000339

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approximations of the allowed and forbidden transitions, resulting from the expansion of the exponential in the matrix element, are the same as for β decay. Plots of the differential cross section as a function of the relative energy of motion and tables of the cross sections as functions of the total reaction energy are presented.
"The authors thank I. S. Shapiro for interest and for valuable advice. One of the authors (Yu. G.) is grateful to L. A. Mikaelyan, V. G. Vaks, and A. I. Larkin of the IAE im. I. V. Kurchatova for interesting discussions." Orig. art. has: 2 figures, 3 formulas, and 2 tables.

ASSOCIATION: None

SUBMITTED: 30Apr64

ENCL: 00

SUB CODE: NP

NR REF SOV: 006

OTHER: 003

Card 2/2

GAPONOV, Yu.V.; KRAYNOV, V.F.

Separation of the corner variables in equations for the effective field in spherical nuclei. IAd. fiz. 1 no.4:573-580 Ap '65.
(MIRA 18:5)

L 25713-66 EWT(1)/EWT(m) DIAAP GG

ACC NR: AP6014816 SOURCE CODE: UR/0367/65/001/004/0573/0580

AUTHOR: Gaponov, Yu. V.; Kraynov, V. P.

ORG: none

TITLE: Separation of angular variables in equations for the effective field in spherical nuclei

SOURCE: Yadernaya fizika, v. 1, no. 4, 1965, 573-580

TOPIC TAGS: forbidden transition, spheric nucleus

ABSTRACT: Equations for the radial part of the effective field in spherical nuclei are obtained and discussed for the case of electromagnetic transitions. The effective field is found for electrical and magnetic allowed and l-forbidden gamma-transitions and for beta-decay. The authors thank A. B. Migdal for his interest in this work. Orig. art. has: 6 formulas and 6 tables. [Based on authors' Eng. abst.] [JPRS]

SUB CODE: 20 / SUBM DATE: 29Aug64 / ORIG REF: 005 / OTH REF: 001

Card 1/1

ISAKOV, I.S., prof., admiral flota, otv.red.; PETROVSKIY, V.A., dotsent, kand.voyenno-morskikh nauk, kontr-admiral, red. [deceased]; DEMIN, L.A., dotsent, kand.geograf.nauk, inzh.-kapitan 1 ranga, glavnyy red.; BARANOV, A.N., red.; BERG, L.S., akademik, inzh.-mayor, red.; BOLOGOV, N.A., dotsent, kontr-admiral v otstavke, red.; VITVER, I.A., professor, doktor geograf.nauk, red.; GRIGOR'YEV, A.A., akademik; YEGOR'YEV, V.Ye., zasluzhennyy deyatel' nauki, prof., doktor voyenno-morskikh nauk, kontr-admiral v otstavke, red.; ZIMAN, L.Ya., prof., red.; ZUBOV, N.N., prof., doktor geograf. nauk, inzh.-kontr-admiral v otstavke, red.; KAVRAYSKIY, V.V., prof., doktor fiziko-mat.nauk, inzh.-kontr-admiral v otstavke, red.; KALESNIK, S.V., prof., doktor geograf.nauk, red.; KUDRYAVTSEV, M.K., general-leytenant tekhn.voysk, red.; LAMYKIN, S.M., kapitan 1 ranga, red.; MATUSEVICH, N.N., zasluzhennyy deyatel' nauki i tekhniki, prof., doktor fiziko-mat.nauk, inzh.-vitse-admiral v otstavke, red., [deceased]; MESHCHANINOV, I.I., akademik, red.; MILENKI, S.G., red.; ORLOV, B.P., prof., doktor geograf.nauk, red.; PANTELEYEV, Yu.A., vitse-admiral, red.; SNEZHINSKIY, V.A., dotsent, kand.voyenno-morskikh nauk, inzh.-kapitan 1 ranga, red.; SALISHCHEV, K.A., prof., doktor tekhn.nauk, red.; TRIBUTS, V.F., admiral, red.; FOKIN, V.A., vitse-admiral, red.; SHVEDE, Ye.Ye., prof., doktor voyenno-morskikh nauk, kontr-admiral, red.; SHULEYKIN, V.V., akademik, inzh.-kapitan 1 ranga, red.; PAVLOV, V.V., inzh.-polkovnik, red.; VOLKOV, F.G.,

(Continued on next card)

ISAKOV, I.S.---(continued) Card 2.

podpolkovnik, pomoshchnik glavnogo red. po izd-vu; SEDOV, N.Ye., kapitan 2 ranga, uchenyy sekretar'; VOROB'YEV, V.I., kapitan 1 ranga, red.kart; MIGALKIN, G.A., inzh.-kapitan 1 ranga, red.kart; GAPONOVA, A.A., red.kart; GONCHAROVA, A.I., red.kart; GORBACHEVA, N.Ye., red.kart; GRYUNBERG, G.Yu., red.kart; DUROV, A.G., red. kart; YERSHOV, I.B., red.kart; ZIL'BERSHER, A.B., red.kart; KASTAL'SKAYA, N.I., red.kart; KUBLIKOVA, M.M., red.kart; MAKAROVA, V.N., red.kart; MOROZOVA, A.F., red.kart; PAVLOVA, Ye.A., red. kart; POCHUBUT, A.N., red.kart; ROMANOVA, G.N., red.kart; SMIRNOVA, L.V., red.kart; SMIRNOVA, L.N., red.kart; TANANKOVA, A.I., red. kart; YANEVICH, M.A., red.kart; YASINSKAYA, L.F., red.kart; VASIL'YEVA, Z.P., tekhn.red.; VIZIROVA, G.N., tekhn.red.; GOLOVANOVA, A.T., tekhn.red.; GORSKHOV, V.I., tekhn.red.; MALINKO, V.I., tekhn. red.; SVIDERSKAYA, G.V., tekhn.red.; CHERNOGOROVA, L.P., tekhn.red.; FURAYEVA, Ye.M., tekhn.red.

[Marine atlas] Morskoi atlas. Otv.red. I.S. Isakov. Glav.red. L.A. Demin. Izd. Morskogo general'nogo shtaba. Vol.1 [Navigation geography] Navigatsionno-geograficheskii. Zamestitel' otv. red. po I tomu V.A. Petrovskii. 1950. 83 maps. (MIRA 12:1)

(Continued on next card)

ISAKOV, I.S.---(continued) Card 3.
1. Russia (1923- U.S.S.R.) Voyenno-morskoye ministerstvo.
2. Nachal'nik Morskogo kartograficheskogo instituta voyenno-morskikh sil (for Lamykin). 3. Deystvitel'nyy chlen Akademii pedagogicheskikh nauk RSFSR (for Orlov). 4. Nachal'nik Gidrograficheskogo upravleniya voyenno-morskikh sil (for Tributs). 5. General'nyy gosudarstv. direktor topograficheskoy sluzhby (for Baranov). 6. Direktor topograficheskoy sluzhby (for Milenki).
(Ocean--Maps) (Harbors--Maps)

L 2930-66 EWT(m)/EPF(c)/EWP(j)/T RPL WW/JWD/RM

ACCESSION NR: AP5023371 UR/0020/65/164/001/0140/0143

AUTHORS: Mikhaylov, A. I.; Gaponova, I. S.; Lebedev, Ya. S.

TITLE: Migration of radical groups in the solid phase

SOURCE: AN SSSR. Doklady, v. 164, no. 1, 1965, 140-143

TOPIC TAGS: free radical, radical migration, epr spectroscopy, free radical formation, free radical generation

ABSTRACT: The migration of free radicals in several organic powders was investigated. The radicals were generated on the surface of the powders by means of a high frequency Tesla coil discharge, and the accumulation of free radicals was observed by epr spectroscopy. The experimental results are presented graphically (see Fig. 1 on the Enclosure) and are compared with a theoretical expression for the accumulation of free radicals. The theoretical expression

$$\frac{n}{n_s} \simeq \frac{l_s}{L} th(n_s k_2 t) + \mathrm{Re}\left\{\frac{\lambda}{L}\sqrt{k_m(t-\tau_s)}\right\}$$

is derived on the assumption that the migration of valence takes place via a "hopping" mechanism and that the radicals decay according to a second order rate law. Here n and n_s are the total and the limiting surface concentration of free

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ACCESSION NR: AP5023371

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radicals respectively, l_s is the depth at which ionizing electrons give rise to free radicals, L the specific surface area, λ - the lattice constant, k_2 - the second rate constant for radical decay, K_m - the hopping frequence, $\tau_s = 1/k_2 n_s$ and t the time. It is concluded that the observed results are best explained in terms of a free radical migration mechanism. Values for estimated migration rates of free radicals, the limiting concentration n_s, depth of migration for a period of 1 hour, and K_m for a number of organic powders are tabulated. Orig. art. has: 1 table and 3 graphs.

ASSOCIATION: Institut khimicheskoy fiziki, Akademii nauk SSSR (Institute for Chemical Physics, Academy of Sciences SSSR)

4455

SUBMITTED: 11Feb65 ENCL: 01 SUB CODE: OC, SS

NO REF SOV: 012 OTHER: 004

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L 2930-66

ACCESSION NR: AP5023371

ENCLOSURE: 01

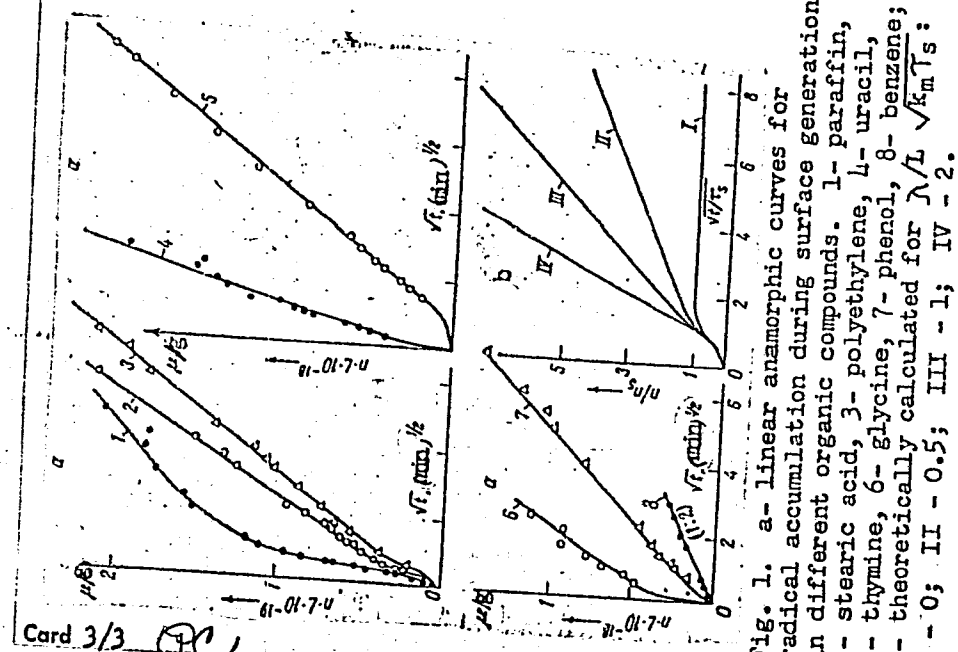

Fig. 1. a- linear anamorphic curves for radical accumulation during surface generation in different organic compounds. 1- paraffin, 2- stearic acid, 3- polyethylene, 4- uracil, 5- thymine, 6- glycine, 7- phenol, 8- benzene; b- theoretically calculated for $\lambda/L\sqrt{k_m\tau_s}$: I - 0; II - 0.5; III - 1; IV - 2.

Card 3/3

S/051/60/008/04/006/032
E201/E691

AUTHORS: Gaponova, N. Ye., Lisitsa, M.P. and Tsyashchenko, Yu. P.

TITLE: Frequencies and Intensities in the Infrared Spectrum of Bromoform

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 4, pp 465-470 (USSR)

ABSTRACT: The absorption spectrum of bromoform ($CHBr_3$) was investigated in the region 460-11700 cm^{-1} using a technique described earlier (Refs 10, 11). The absorption spectrum obtained is shown in Fig 1. The interpretation, symmetry, absorption coefficients at the band maxima (K_{max}), half-widths (Γ) and integral absorption (S) are listed in a table on pp 466-7. The values of S and Γ are given only for the fundamental vibrations and for isolated bands which can be easily separated into symmetrical components. The table includes also the published (Refs 4, 8) frequencies of various band maxima. The intensities of the fundamental vibrations and harmonics were explained in terms of the degree of polarity of the chemical bonds. Comparison of the absorption spectra of $CHBr_3$ and $CHCl_3$ showed that the integral absorption of the

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E201/E691

Frequencies and Intensities in the Infrared Spectrum of Bromoform

fundamental vibration bands depends on the degree of polarity of the bonds which determine the forms of these vibrations. There are 2 figures, 1 table and 16 references, 7 of which are Soviet, 3 English, 4 French, 1 Italian and 1 translation from English into Russian.

SUBMITTED: June 29, 1959

Card 2/2

GAPONOVA, Valentina, moyshchitsa

From the secondary school to the shop. Grazhd.av. 18 no.8:5 Ag '61. (MIRA 14:8)

(Machine shop practice)